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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/565,171	01/19/2006	Mori Nagayama	040302-0540	7246

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FOLEY AND LARDNER LLP
SUITE 500
3000 K STREET NW
WASHINGTON, DC 20007

EXAMINER	
WANG, EUGENIA	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/565,171	NAGAYAMA ET AL.	
	Examiner	Art Unit	
	Eugenia Wang	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-43* is/are pending in the application.

4a) Of the above claim(s) *15-43* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 January 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/19/06, 7/24/06, 2/8/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group 1 (claims 1-14) in the reply filed on May 16, 2007 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Accordingly, claims 15-43, drawn to nonelected inventions, have been withdrawn from consideration.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

3. The information disclosure statements (IDS) submitted on January 19, 2006, July 24, 2006, and February 8, 2007 have been placed in the application file and the information referred to therein has been considered as to the merits with the exception of KR 2001-0072835 and the body of JP 60-115179 (only the abstract has been considered). Examiner invites Applicant to submit a translation for the aforementioned pieces proper consideration.

Drawings

4. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled

"Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to because:

a. In fig. 4, [35] is defined as the electrolyte (p 9, line 10), however, [35] is pointing at the solid active material. Applicant should change the arrow, such that [35] points to the electrolyte.

b. The specification defines the solid active material as [45] and the electrolyte as [35] (p. 10, lines 19-20). (As is mentioned below with the drawing objection, [44] is not defined in the specification. However, fig. 5, shows [44] pointing to the electrolyte, and so it is taken that [44] and its corresponding subunits (a-c) refer to the electrolyte). However, the subunits of each ([44a,c] and [45a,c]) are mislabeled on the drawing. For example in the Specification, 44a is defined to be the electrolyte (p 10, lines 22-24), however 44a points at a solid particle. Likewise, 45a is defined as a solid active material (p 10, lines 22-24), however it is pointing at the electrolyte. The same mistake exists for the "c" subunit of [44] and [45] (described on p11, line 1).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an

amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

(It is noted that any of the aforementioned problems are due to an inconsistency between the specification and drawings. Applicant is free to amend a combination of the Drawings and Specification in a different manner than Examiner suggests as long as all of the issues are resolved.)

6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: [44]. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of

an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

7. The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

8. The disclosure is objected to because of the following informalities:

c. Solid material is defined as [25] on p7, line 2, where the solid material has previously been labeled as [24] within fig. 3. Examiner sees this as a typographical error.

d. The specification defines the solid active material as [34] and the electrolyte as [35] (p. 9, lines 9-10). However, the subunits of each ([34a-c] and [35a-c], respectively) are mislabeled within p9 lines 13-22. For example, [34a] is called the electrolyte, and [35a] is called the solid active material, whereas the drawings coincide with the original definition of the solid active material as [34] and the electrolyte as [35]. [34a] points clearly at the solid material and [35a] points clearly at the electrolyte. The same mistake exists for the "b" and "c" subunit of [34] and [35]. (It is noted that this problem is due to an inconsistency between the specification and drawings. Applicant is free to amend a different combination of the Drawings and Specification in a different manner than Examiner suggest as long as all of the issues are resolved.)

e. The casing is labeled as [204] on p16, line 9. However, the casing has been previously defined as [202] (p16, line 4).

Appropriate correction is required.

9. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claims 1, 2, 4-7, 9, 11, 13 and 14 rejected under 35 U.S.C. 102(b) as being anticipated by EP 0858120 (Yoshida et al.).

As to claim 1, Yoshida et al. teach a secondary battery and a method of making that secondary battery (title). In embodiment 5, Yoshida et al. teach that has a final product where the polymer, and the electrolyte, accordingly, in the electrode showed a density gradient in such a manner that it's concentration is not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33).

As to claims 2 and 4, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes (abs). Furthermore, it is taught that the active material of the electrodes are placed on current collectors (p7, lines 17-25). As previously stated, the end product is an electrode where the polymer, and the electrolyte, accordingly, in the electrode showed a density gradient in such a manner that it's concentration is not strong towards the current collector, but

heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$ (active material), graphite powder (conductive material), polystyrene powder (binder), and a solvent as can be seen from p. 7, lines 17-33). (All of the additions to the active material mixture are solids, except for the non-active solvent.)

As to claim 5, Yoshida et al. teach that the active material mixture preferably comprises a binder resin, an organic solvent, an electrically conducting particulate material incorporated with the active material (p4, lines 41-44).

As to claims 6 and 13, Yoshida et al. teach that the electrode material applied to both the positive and negative electrode current collector is about 100 μm, which encompasses the upper limit of the claim of the instant application (p7, lines 17-25).

As to claim 7, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes, where the electrolytic solution is injected into the electrodes containing active material (abs). As previously mentioned, the end product is an electrode where the polymer, and the electrolyte, accordingly, are in the electrode in such a manner that the concentration of the polymer and electrolyte are not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33). Therefore, there is inherently a

concentration gradient of electrolyte salt towards the collector, since there is less electrolyte and thus electrolyte salt towards the current collector (with the space being taken up by the active material mixture) than away from the current collector.

As to claim 9, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes, where the electrolytic solution is injected into the electrodes containing active material (abs). As previously mentioned, the end product is an electrode where the polymer, and the electrolyte, accordingly, are in the electrode in such a manner that the concentration of the polymer and electrolyte are not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33). Therefore, a concentration gradient of polymer through the thickness of the active material mixture layer and the collector exists, as it was previously stated that the polymer concentration is not strong towards the collector and is stronger on the side opposite the current collector (p7, lines 34-38). (The polymer is taken to be the film forming material.)

As to claim 11, Yoshida et al. teach a nonaqueous electrolytic solution, which is applied to collectors to form positive and negative electrodes, where the electrolytic solution is injected into the electrodes containing active material (abs). As previously mentioned, the end product is an electrode where the polymer, and the electrolyte, accordingly, are in the electrode in such a manner that the concentration of the polymer

and electrolyte are not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33). Therefore, there is inherently a concentration gradient of electrolyte salt towards the collector, since there is less electrolyte and thus electrolyte salt towards the current collector (with the space being taken up by the active material mixture) than away from the current collector. Furthermore, a concentration gradient of polymer through the thickness of the active material mixture layer and the collector exists, as it was previously stated that the polymer concentration is not strong towards the collector and is stronger on the side opposite the current collector (p7, lines 34-38). (The polymer is taken to be the film forming material.)

As to claim 14, Yoshida et al. teach a method of making the battery with a an active material density gradient, which consists of preparing an active material mixture, forming electrodes with the active material, assembling the electrodes into an electrode laminate, and then injecting electrolytic solution into the electrode laminate (p2, lines 54-58; p3, line 1). Specific example given in Embodiment 5 confirms the fact that the active material mixture layer has a density gradient, since the final product's polymer, and the electrolyte, accordingly, in the electrode showed a density gradient in such a manner that it's concentration is not strong towards the current collector, but heavier towards the other side (p7, lines 34-38). Consequently, the active material mixture

would occur in an opposite manner, so that the active material would occur in higher concentration (where the active material mixture comprises of $LiCoO_2$, graphite powder, polystyrene powder as can be seen from p. 7, lines 17-33).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 3, 8, 10, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida et al., as applied to claim 1, in view of US 2002/0028380 (Tanjo et al.)

The teachings of Yoshida et al. have been previously discussed and are herein incorporated.

As to claims 3, 8, 10, and 12, Yoshida et al. does not specifically teach that the active material mixture layer comprises a plurality of laminated thin film layers different in (a) the solid concentration (active material) (as applied to claim 3), (b) the concentration of the electrolyte salt (as to claim 8), (c) the concentration of film forming material (polymer) (as applied to claim 10), and (d) the concentrations of the electrolyte salt and film forming material along a thickness from the surface of the current collector to the other side of the electrode.

Tanjo et al. teach an active material layer, where the active material layers have different porosities and are layered accordingly (para 0051, lines 1-3; fig. 3). Using multi-layers, power density can be increased without sacrificing energy density (para 0051, lines 6-7). Furthermore, Tanjo et al. teach that energy density is influenced by average porosity and active material amount in the active layer [20] (para 0051, lines 22-27). *And* power density can be effectively increased by balancing the diffusion in the positive active material [10] and the migration in the electrolytic solution [50] (para 0051, lines 18-22). Therefore, the motivation of making separate layers for gradients (be it of the porosity, active material concentration, electrolyte salt concentration, film forming material concentration, or a combination of the electrolyte salt and film forming material

concentration) is to control power and energy density. Therefore it would have been obvious to one having ordinary skill in the art at the time the claimed invention was made to create separate layers for the gradient in Yoshida et al.'s teaching in order to more effectively promote power and energy density.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugenia Wang whose telephone number is 571-272-4942. The examiner can normally be reached on 8 - 4:30 Mon. - Fri., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EW

GREGG CANTELMO
PRIMARY EXAMINER

11 June 2007